



SUNRISE Technology

SPECIFICATION

SPEC. NO. : _____ REV : 1.0

DATE : 2018. 11. 06

PRODUCT NAME : AI00130
Bluetooth[®] 3.0 Stereo Audio Module

	APPROVED	CHECKED	PREPARED	DCC ISSUE
NAME				



Bluetooth® 3.0 Stereo Audio Module

High performance 32-bit RISC CPU

- RISC 32bit CPU
- DC-160MHz operation
- Support DSP instructions
- 64 Vectored interrupts
- 4 Levels interrupt priority

Peripheral Feature

- One full speed USB 2.0 OTG controller
- Four multi-function 16-bit timers, support capture and PWM mode
- One full-duplex basic UART
- One full-duplex advanced UART
- One SPI interface supports host and device mode
- One IIC interface supports host and device mode
- Watchdog
- 1 Crystal Oscillator
- 16-bit Stereo DAC, SNR > 90dB
- 1 channels Stereo ADC, SNR > 90dB
- 1 channel MIC amplifier
- Embedded headphone amplifier
- 1 channels Stereo analog MUX
- 10-bit ADC
- 2 channels 4 levels Low Voltage Detector
- Built in Cap Sense Key controller
- Power-on reset
- Embedded MU

Bluetooth Feature

- CMOS single-chip fully-integrated radio and baseband
- Compliant with Bluetooth V3.0 specification Bluetooth Piconet and Scatternet support
- Frequency: 2.402 to 2.480 GHz
- Meet class2 and class3 transmitting power requirement
- Provides -2.88dbm transmitting power
- receiver with -85dBm sensitivity
- Connection Distance: >10m (free space and no interference)
- Support a2dp\avctp\avdtp\avrcp\hfp\spp\smplatt\gap\gatt\rfcomm\sdp\l2cap profile

Power Supply

- LDOIN is 3.3V to 5.5V
- VDDIO is 3.0V to .6V

Antenna

- Printed Antenna

Temperature

- Operating temperature: -40°C to +85°C
- Storage temperature: -65°C to +150°C

Applications

- Bluetooth sound bar
- Bluetooth stereo speaker phone

1、Interface Description

1-1. AI00130 PIN Diagram

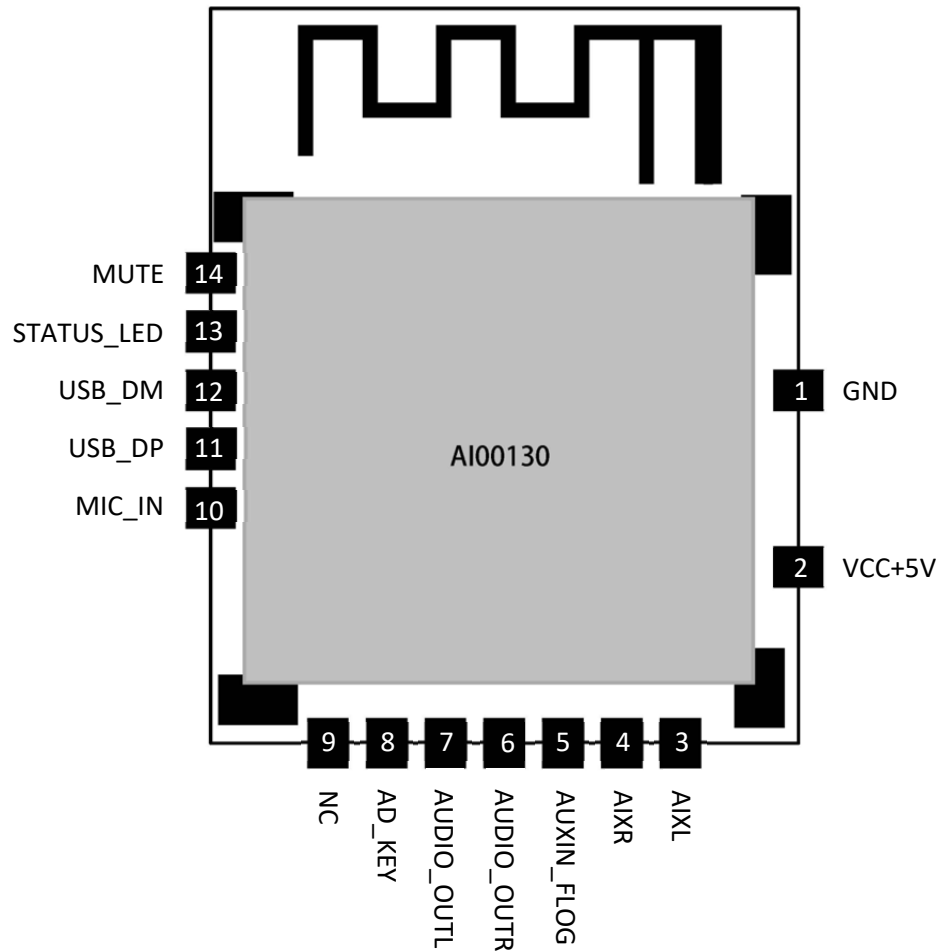


Figure1-1 AI00130 PIN Diagram

1-2. PIN Description

Table1-1 AI00130_PIN Description

PIN NO.	Name	I/O Type	Drive (mA)	Function	Other Function
1	GND	P	/	Ground	
2	VCC+5V	P	/	LDO Power Supply	
3	AIXL	I	24	AUX-IN_L	
4	AIXR	I	24	AUX-IN_R	
5	AUXIN_FLOG	I	24	AUX-IN_FLOG	
6	AD_KEY	I	24	AD_KEY	
7	AUDIO_OUTR	O	/	DAC Right Channel	
8	AUDIO_OUTL	O	/	DAC Left Channel	
9	NC	/	/		
10	MIC_IN	I	16	MIC_IN	
11	USBDP	I/O	4	USB Positive Data	
12	USBDM	I/O	4	USB Negative Data	
13	STATUS_LED	O	16	STATUS_LED	
14	MUTE	O	16	MUTE	

2、Electrical Characteristics

2-1. PMU_VOLTAGE and CURRENT Specification

表2-1

Symbol	Parameter	Min	Type	Max	Unit	Condition
LDOIN	Voltage Input	3	3.7	5.5	V	
V _{3.3}	Voltage output	—	3.3	—	V	LDO5V = 5V, 100mA loading
V _{1.2}		—	1.2	—	V	LDO5V = 5V, 50mA loading
V _{1.5}	Voltage output		1.5		V	LDO5V=5V, 100mA loading
V _{DACVDD}	DAC Voltage	—	3.1	—	V	LDO5V = 5V, 10mA loading
I _{L3.3}	Loading current	—	—	150	mA	LDO5V = 5V

2-2. IO_INPUT and OUTPUT Logical Level

表2-2

IO_INPUT						
Symbol	Parameter	Min	Type	Max	Unit	C
V _{IL}	Low-Level Input Voltage	-0.3	—	0.3* VDDIO	V	VDDIO = 3.3V
V _{IH}	High-Level Input	0.7* VDDIO	—	VDDIO+0.3	V	VDDIO = 3.3V
IO_OUTPUT						
V _{OL}	Low-Level Output	—	—	0.33	V	VDDIO = 3.3V
V _{OH}	High-Level Output Voltage	2.7	—	—	V	VDDIO = 3.3V

2.3 IO Output Ability、Pull-Hi & Pull-Lo Characteristic

Table2-3

Port	Normal Output	Force Output	Pull-Hi	Pull-Lo	Remark
USBDM USBDP	4mA	—	1.5K	15K	

2.4 DAC Characteristic

Parameter	Min.	Type	Max.	Unit	Test Condition
Frequency Response	20	—	20,000	Hz	1KHz/0dB 10Kohm loading With A-Weighted Filter
THD+N	—	-70	—	dB	
S/N	—	90	—	dB	
Crosstalk	—	-86	—	dB	
Output Swing		1.08		V _{rms}	1KHz/-60dB 10Kohm loading With A-Weighted Filter
Dynamic Range		91		dB	
DAC Output Power	—	>11	—	mW	

2.5 ADC Characteristic

Parameter	Min.	Type	Max.	Unit	Test Condition
Dynamic Range		91		dB	1KHz/-60dB 10Kohm loading With A-Weighted Filter
S/N	—	90	—	dB	1KHz/-60dB 10Kohm loading With A-Weighted Filter
THD+N	—	-70	—	dB	
Crosstalk	—	-80	—	dB	

2.6 BT Characteristic

Table 2-4

Parameter	Min.	Type	Max.	Unit	Test Condition
Maximum Output Power	—	2	—	dBm	—
RMS DEVM	—	5.3	—	%	Maximum output power
PEAK DEVM	—	12	—	%	
99% DEVM	—	8	—	%	
EDR Relative Power	—	-1.4	—	dB	
BDR Sensitivity	—	-84	—	dBm	BER=0.001
EDR Sensitivity	—	-86	—	dBm	BER=0.0001

3、PRINTED ANTENNA INFORMATION

MODULE RADIATION PATTERN

The stereo module contains a PCB printed antenna. The PCB printed antenna radiation pattern is shown in Figure 3-2.

FIGURE 3-1: ANTENNA KEEP OUT AREA EXAMPLES

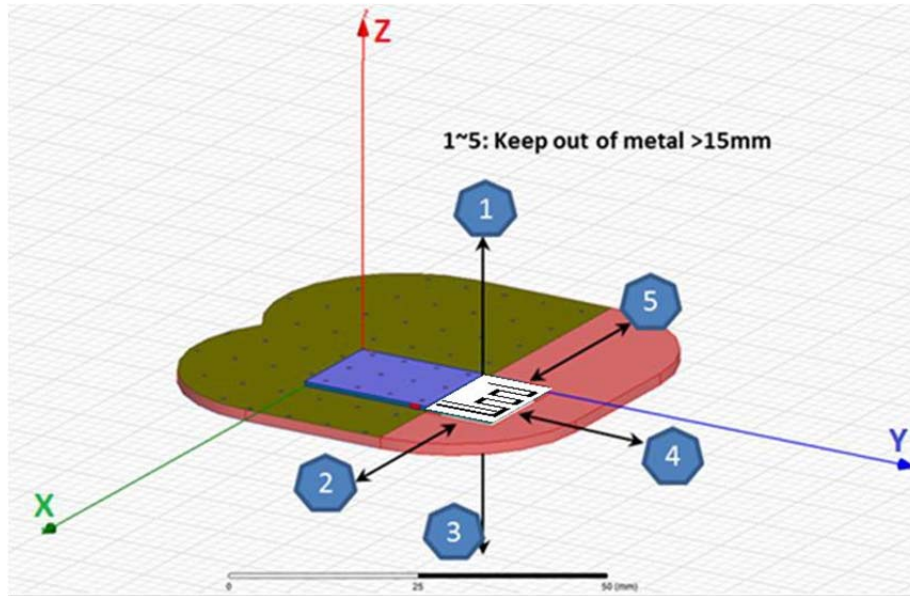
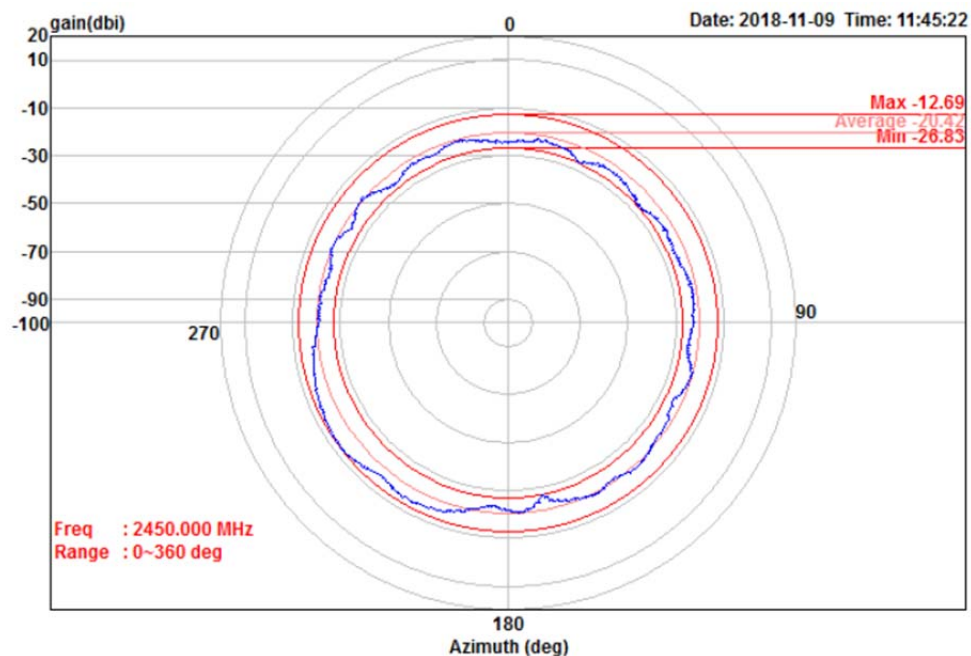
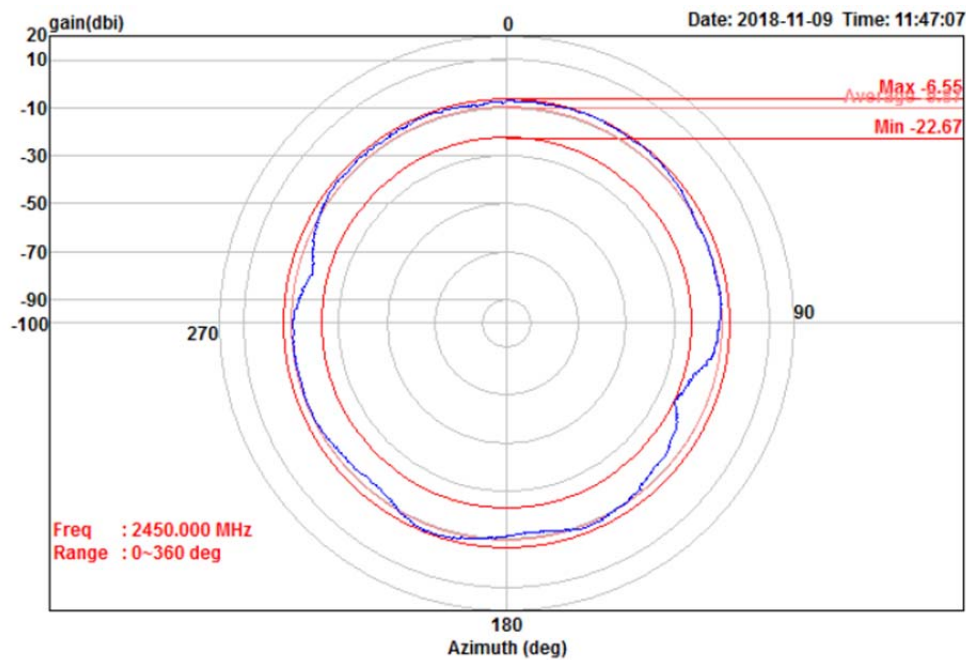


FIGURE 3-2: ANTENNA 2D RADIATION PATTERN @2450 MHz



Condition : 3m VERTICAL
 Project Number:
 Compy :
 Model : PCB
 Test Mode : 2450
 Test Site : Chamber xx
 Temp/Humi : 25/60



Condition : 3m HORIZONTAL
Project Number:
Compy :
Model : PCB
Test Mode : 2450
Test Site : Chamber xx
Temp/Humi : 25/60

4、Version Information

Date	number	Description
2018.11.06	V1.0	Initial Version



<< BLANK >>

Federal Communications Commission (FCC) Statement

15.21

You are cautioned that changes or modifications not expressly approved by the part responsible for compliance could void the user's authority to operate the equipment.

15.105(b)

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- 1) this device may not cause harmful interference, and
- 2) this device must accept any interference received, including interference that may cause undesired operation of the device.

FCC RF Radiation Exposure Statement

- 1) This Transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.
- 2) This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment.

This equipment should be installed.

Note: The end product shall have the words "Contains Transmitter Module FCC ID:

2AMPPAI00130"

Canada, Industry Canada (IC)

This Class B digital apparatus complies with Canadian ICES-003

Cet appareil numérique de classe B est conforme à la norme NMB-003.

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject

to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

(1) l'appareil ne doit pas produire de brouillage, et

(2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Canada, avis d'Industry Canada (IC)

“Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

(1) l'appareil ne doit pas produire de brouillage, et

(2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.”

(Modular approval) End Product Labeling:

The final end product must be labeled in a visible area with the following: “Contains IC: **11471A-AI00130**”.

Caution: Exposure to Radio Frequency Radiation.

To comply with RSS 102 RF exposure compliance requirements
OEM statement

The Original Equipment Manufacturer (OEM) must ensure that the OEM modular transmitter must be labeled with its own FCC ID number. This includes a clearly visible label on the outside of the final product enclosure that displays the contents shown below. If the FCC ID is not visible when the equipment is installed inside another device, then the outside of the device into which the equipment is installed must also display a label referring to the enclosed equipment.

The end product with this module may subject to perform FCC part 15 unintentional emission test requirement and be properly authorized.

This device is intended for OEM integrator only